

[035] Fig. 4 shows a side view of the apparatus according to the invention in the direction of arrow IV from Fig. 2;

Fig. 4A shows a side view similar to Fig. 4 with the sheet-metal feeder and the receiving table being oblique with respect to the two conveyor devices;

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[039] Fig. 8 shows a view of part of a V-belt in the direction of arrow VIII from Fig. 7;

[039] Fig. 8A shows a view similar to Fig. 8 with the bristles having a wavy or twisted profile;

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[061] The solution according to the invention illustrated is a variant in which the conveyor devices 2 are arranged in a standing position, so that the brushes 3 of the conveyor device 2 run substantially vertically in the region of the workpiece. In an additional embodiment, as shown in Fig. 4A, the workpiece (1) can be guided, obliquely or transversely with respect to the direction of rotation of the conveyor devices (2), between two conveyor devices (2).

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[074] Figures 7 to 9 illustrate individual bristles 12 of the brushes 3. In a simplified illustration, the bristles 12 are represented as having a straight profile. However, in an advantageous embodiment it is possible to provide for the bristles 12 to have a wavy or twisted profile, as shown in Fig. 8A, so that the bundles 120 formed by the bristles 12 resemble a tangled paintbrush or a tuft.

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1-38. (CANCELED)

39. (CURRENTLY AMENDED) An apparatus for machining a metallic workpiece, being one of [[in]] strip or plate form and having first and second opposed main surfaces, in particular for removing an oxide layer from a [[cut]] surface or an [[cut]] edge of at least one of the first and the second main surfaces of the workpiece,

wherein the apparatus comprises at least first, second, third and fourth revolving conveyor devices (2, 2, 2, 2) ~~is provided with~~ and each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has at least one brush (3), guides each of the at least the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) guides the respective at least one brush (3) at least approximately linearly past [[the]] a region of the workpiece (1) that is to be machined[[,]] one of obliquely or transversely with respect to an advance direction of advance of the workpiece (1), the first and the third conveyor devices (2, 2) rotate in opposite directions and are positioned for treating the first main surface of the workpiece (1), the second and the fourth conveyor devices (2, 2) rotate in opposite directions and are positioned for treating the second main surface of the workpiece (1), and the first and the fourth conveyor devices (2, 2) both rotate so as to guide the brushes (3) in a direction from a top of the apparatus toward one of a base plate (9) or a delimiting plate of the apparatus.

40. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein the at least the first, the second, the third and the fourth conveyor devices (2) [[is]] are arranged in a standing position, so that the at least one brush (3) of each of the at least the first, the second, the third and the fourth conveyor devices (2) runs one of substantially vertically in a region of along the workpiece (1) in a standing position, or in a lying position, so that the at least one brush (3) runs substantially horizontally in the region of along the workpiece (1) in a lying position.

41. (CURRENTLY AMENDED) The apparatus according to claim ~~[[39]]~~ 45, wherein the workpiece (1) is guided between the first and the second [[two]] conveyor devices (2) are provided between which the workpiece (1) can be guided obliquely or transversely with respect to the direction of rotation of the conveyor device (2), in such a manner that each of the first and the second conveyor devices (2) machines one of

~~two the first and the second~~ main surfaces (1c) of the workpiece (1) ~~by the associated~~
brushes (3).

42. (CURRENTLY AMENDED) The apparatus according to claim 41, wherein the direction of rotation of the first and the second conveyor devices (2) is selected such that the brushes (3) of the first and the second conveyor devices (2) ~~can be~~ are guided past the opposed first and the second main surfaces (1c) of the workpiece (1) in ~~[[the]]~~ a same direction.

43. (CURRENTLY AMENDED) The apparatus according to claim 40, wherein the direction of rotation of the first and the second conveyor devices (2) arranged in ~~[[a]]~~ the standing position is selected such that the at least one brush (3) ~~can be~~ of the at least first and the second conveyor devices (2) is guided past the workpiece (1) in one of the direction of a base plate (9), or from [[the]] a top of the apparatus downward.

44. (CURRENTLY AMENDED) The apparatus according to claim 40, wherein the direction of rotation of the first and the second conveyor devices (2) arranged in ~~[[a]]~~ the lying position is selected such that the at least one brush (3) ~~can be~~ of the first and the second conveyor devices (2) is guided along the workpiece (1) in the direction of a delimiting plate which guides the workpiece (1) at one end side.

45. (CURRENTLY AMENDED) ~~The apparatus according to claim 39, wherein four conveyor devices (2) are provided such that, in each case~~ An apparatus for machining a metallic workpiece, being one of strip or plate form and having first and second opposed main surfaces, for removing an oxide layer from a surface or an edge of at least one of the first and the second main surfaces of the workpiece,

wherein the apparatus comprises at least first and second conveyor devices (2, 2) and each of the first and the second conveyor devices (2, 2) has at least one brush (3), each of the at least the first and the second conveyor devices (2, 2) guides the respective at least one brush (3) at least approximately linearly past a region of the workpiece (1) to be treated one of obliquely or transversely with respect to an advance direction of the workpiece (1), the first and the second conveyor devices (2, 2) rotate in opposite directions and both are positioned for treating, two oppositely rotating conveyor devices (2) machine one of the first and the second main surfaces (1c) of the workpiece (1).

46. (CURRENTLY AMENDED) ~~The apparatus according to claim 39, wherein~~
An apparatus for machining a metallic workpiece, being one of strip or plate form and
having first and second opposed main surfaces, for removing an oxide layer from a
surface or an edge of at least one of the first and the second main surfaces of the
workpiece,

wherein the apparatus comprises at least first and second conveyor
devices (2, 2) and each of the first and the second conveyor devices (2, 2) has at least
one brush (3), each of the at least the first and the second conveyor devices (2, 2)
guides the respective at least one brush (3) at least approximately linearly past a region
of the workpiece (1) to be treated one of obliquely or transversely with respect to an
advance direction of the workpiece (1), the first and the second conveyor devices (2,
2) rotate in opposite directions and the first conveyor device (2) machines the first main
surface of the workpiece (1) while the second conveyor device (2) machines the second
main surface of the workpiece (1), and the first and the second conveyor devices (2)
are arranged slightly offset, preferably by 10 to 100 mm, with respect to one another in
the advance direction in which the workpiece (1) passes through.

47. (CANCELED)

48. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein
each of the at least [[one]] first, the second, the third and the fourth conveyor devices
(2, 2, 2, 2) [[has]] has a plurality of brushes (3) arranged at a spacing distance from one
another.

49. (CURRENTLY AMENDED) The apparatus according to claim 39, ~~wherein~~
~~there is~~ further comprising a guide passage (4), which can be is set to [[the]] a thickness
of the workpiece (1) and by means of which the workpiece (1) can be is displaced with
[[a]] guidance, transversely with respect to the direction of rotation of the at least one
of the first, the second, the third and the fourth conveyor guide devices (2).

50. (CURRENTLY AMENDED) The apparatus according to claim 41, wherein
the first and the second conveyor devices (2) can be are displaced or adjusted with
respect to one another so as to correct for wear of the at least one brush (3).

51. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein
bristles (12) of the at least one brush (3) of each of the first, the second, the third and

the fourth conveyor devices (2, 2, 2, 2) have at least one of a wavy and ~~[[/or]]~~ twisted profile. ❖

52. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein bristles (12) of the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) are formed as one of intertwined bristles and abrasive bristles. ❖

53. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein bristles (12) of the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) are inclined by up to 45° in the direction of rotation. ❖

54. (CURRENTLY AMENDED) The apparatus according to claim 51, wherein the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) ~~is provided with~~ has supporting bristles (20) for supporting and stabilizing other bristles (12) of the brush (3). ❖

55. (CURRENTLY AMENDED) The apparatus according to claim 52, wherein ~~in each case~~ a bundle (120) of bristles (12) is surrounded by a stabilizing and supporting sheath (21). ❖

56. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein the at least one brush (3) or bristles (12) of the at least one brush (3) is ~~one of adhesively bonded, molded, screwed, stamped or welded~~ coupled to ~~[[the]]~~ a respective conveyor device (2) by one of a bond, a screw and a weld. ❖

57. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein the rotational speed of the at least one brush (3) is between 5 to 30 m/sec. ❖

58. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has an independent drive. ❖

59. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is ~~provided with~~ one of a V-belt (13), a toothed belt, a flat belt with studs and a chain. ❖

60. (CURRENTLY AMENDED) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is a triple V-belt (13a, 13b, 13c), with a middle V-belt (13a) accommodating the brushes (3). ❖

61. (PREVIOUSLY PRESENTED) The apparatus according to claim 59, wherein the V-belt (13) is formed from at least one of rubber, plastic, synthetic rubber and neoprene.

62. (CURRENTLY AMENDED) The apparatus according to claim 59, wherein the V-belt has a [[PU]] polyurethane covering layer (14) ~~is applied to the V-belt (13), and~~ a carrier (15), which is ~~preferably~~ formed from one of rubber or plastic, for one of the brush (3) or bristles (12) of the brush (3), ~~is welded onto~~ coupled to the PU covering layer (14) by a weld. ❖

63. (CURRENTLY AMENDED) The apparatus according to claim 59, wherein a carrier (15), which is preferably formed from one of rubber or plastic, for one of the brush (3) or bristles (12) of the brush (3) is ~~one of screwed, riveted, adhesively bonded, welded or clipped onto~~ coupled to the V-belt (13) by one of a screw, a rivet, a bond, a weld and a clip. ❖

64. (CURRENTLY AMENDED) The apparatus according to claim 63, wherein a top side of the V-belt (13), ~~on a top side intended for connection to~~ communicates with the carrier (15), the top side [[has]] having one of elevations or protuberances (17) for one of guiding and supporting the carrier. ❖

65. (CURRENTLY AMENDED) The apparatus according to claim 62, wherein the carrier retains the bristles (12) ~~are shot into held the carrier (15)~~ in bundles (120). ❖

66. (CURRENTLY AMENDED) The apparatus according to claim 62, wherein the carrier (15) ~~[[,]]~~ is formed from one of a plurality of individual segments (15b) or has slots (16) transverse[[ly]] aligned with respect to the direction of rotation of the conveyor device (2), ~~has slots (16) or is formed from individual segments (15b);~~ the plurality of segments (15b) or ~~[[the]]~~ pieces (15a) ~~formed~~ separated by the slots (16) having a length of from 10 to 40 mm. ❖

67. (CURRENTLY AMENDED) The apparatus according to claim 66, wherein each of the segments (15b) ~~[[each]]~~ have a groove (18) ~~[[at]]~~ in one of a leading or ❖

trailing end and a tongue (19) ~~[[at]]~~ in the other of a leading or trailing end, by means of which the segments (15b) ~~can be~~ are connected to one another.

68. (CURRENTLY AMENDED) The apparatus according to claim 66, wherein ~~in each case~~ between two to four adjacent segments (15b) or adjacent pieces (15a) ~~separated by the slots (16), are provided with~~ have bristles (12) and together form ~~[[a]]~~ the brush (3).

69. (CURRENTLY AMENDED) The apparatus according to claim 68, wherein between one to three adjacent bristle-free segments (15b) or pieces (15a) are arranged between the brushes (3) of a V-belt (13).

70. (CURRENTLY AMENDED) The apparatus according to claim 66, wherein ~~each of the~~ adjacent pieces (15a) or segments (15b) are ~~arranged at a distance from one another or in free-standing form, with the distance being~~ separated by approximately 3 to 20 mm.

71. (CURRENTLY AMENDED) The apparatus as claimed claim 39, wherein a resistance element (23) is ~~arranged~~ located downstream ~~[[of]]~~ from a diversion point (22) of the conveyor device (2), as seen in the direction of rotation, before one of the brush (3) or bristles (12) ~~comes back into~~ resumes contact with the metallic workpiece (1) ~~in strip or plate form~~.

72. (CURRENTLY AMENDED) The apparatus according to claim 71, wherein the resistance element (23) is ~~arranged~~ located in ~~[[the]]~~ a region in which the brush (3) or ~~[[its]]~~ bristles (12) leave ~~[[the]]~~ a circular path produced by the diversion point (22) of the conveyor device (2) and ~~merge(s) into~~ returns to one of a linear or rectilinear movement.

73. (CURRENTLY AMENDED) The apparatus according to claim 71, wherein the resistance element (23) ~~one of~~ mechanically ~~[[and]]~~ prevents the bristles (12) from yielding in the direction of rotation.

74. (CURRENTLY AMENDED) The apparatus according to claim 73, wherein the ~~steel roll~~ resistance element (23) ~~[[can be]]~~ is introduced into ~~[[the]]~~ a path of the brush (3) or bristles (12) such that tips of the bristles (12) butt against ~~[[it]]~~ the resistance element.

75. (CURRENTLY AMENDED) ~~A V-belt for use in the~~ The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is a V-belt having bristles (12), which are one of adhesively bonded, molded, screwed, stamped or welded coupled onto a top side of the V-belt by one of a bond, a screw and a weld, either directly or via a carrier, the bristles (12) being are inclined by up to 45° in the direction of rotation of the V-belt.

76. (CURRENTLY AMENDED) A method for machining a metallic workpiece in strip or plate form, in particular for removing the oxide layer from a cut surface or cut edge of the workpiece, ~~wherein the method comprising the steps of:~~

providing first, second, third and fourth ~~a rotating~~ conveyor devices (2) ~~which is provided with each having at least one brush (3);~~

~~operated~~ operating the first, the second, the third and the fourth conveyor devices (2) such that the at least one brush (3) runs at least approximately linearly in a region corresponding to ~~[[the]]~~ dimensions of the workpiece (1), ~~and;~~

guiding the workpiece (1) is guided past the first, the second, the third and the fourth conveyor devices (2) one of obliquely or transversely with respect to [[the]] a direction of rotation of the first, the second, the third and the fourth conveyor devices (2)[[.]] the first conveyor device (2) machining a first side of the workpiece and the second conveyor device (2) machining a second surface, the third conveyor device (2) machining the first surface and the fourth conveyor device (2) machining the second surface, the first and the third conveyor devices rotating in opposite directions and the second and the fourth conveyor devices rotating in opposite directions; and

ensuring making contact [[with]] between the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) and the brush (3).

77. (NEW) An apparatus for machining a metallic workpiece, having first and second opposed main surfaces and being one of strip or plate form, for removing an oxide layer from a surface or an edge of at least one of the first and the second main surfaces of the workpiece;

wherein the apparatus comprises at least first and second conveyor devices (2, 2) each having at least one brush (3), each of the first and the second conveyor devices (2, 2) guides the respective at least one brush (3) approximately

linearly past a region of the workpiece (1) to be treated one of obliquely or transversely with respect to an advance direction of the workpiece (1), the first and the second conveyor devices (2, 2) rotate in opposite directions to one another and both are positioned one side of the apparatus for treating only one of the first and the second main surfaces (1c) of the workpiece (1).